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### (54) Overlay alignment measurement of semiconductor wafers

(57) The present invention is a new target, and associated apparatus and methods, for determining offset between adjacent layers of a semiconductor device. The target disclosed here includes a first periodic structure to be placed on a first layer of the device and a second periodic structure, that complements the first periodic structure, placed on a second layer of the

device at a location that is adjacent the first periodic structure when the second layer is placed on the first layer. Any offset that may occur is detected by the present invention either optically, micro-mechanically or with electron beams using any of various methods and system embodiments.

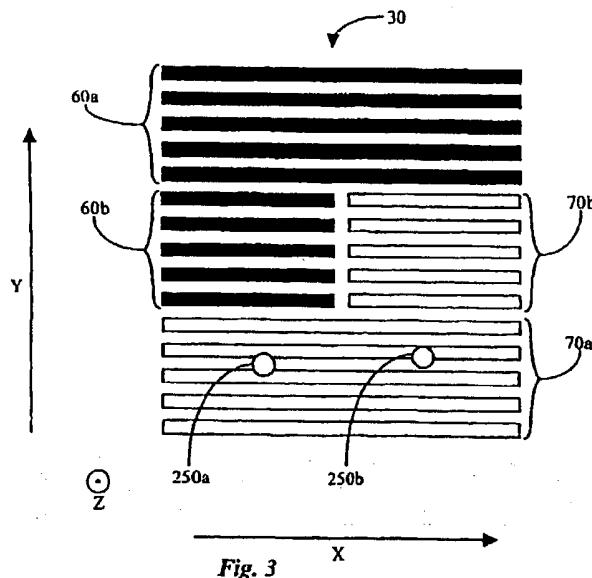


Fig. 3

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## EUROPEAN SEARCH REPORT

Application Number  
EP 97 30 5036

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 4 529 314 A (PORTS KENNETH A) 16 July 1985 * column 1, line 7 - line 10 * * column 2, line 51 - column 3, line 1 * * figures 3,4 *	1-3	H01L21/66
A	---	9,16-19, 23, 25-27, 29,44,45	
X	EP 0 449 582 A (CANON KK) 2 October 1991 * page 3, line 3 - line 8 * * page 4, line 10 - page 7, line 24; figures 1-7 * * page 11, line 55 - page 13, line 42; figures 25-27 *	1,2	
A	---	9,16-19, 23, 25-27, 29,44,45	
A	US 5 332 898 A (TORO-LIRA GUILLERMO L ET AL) 26 July 1994 * column 3, line 4 - column 4, line 17 * * column 7, line 55 - line 65 * * figure 1 *	25	TECHNICAL FIELDS SEARCHED (Int.Cl.6) G03F
A	US 5 321 977 A (CLABES JOACHIM ET AL) 21 June 1994 * column 1, line 24 - line 33 * * column 3, line 58 - line 68 * * column 5, line 17 - line 37 * * figures 1,4 *	26,27, 44,45	
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	7 January 1999	Heryet, C	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 97 30 5036

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

07-01-1999

Patent document cited in search report		Publication date	Patent family member(s)			Publication date
US 4529314	A	16-07-1985	NONE			
EP 0449582	A	02-10-1991	CA	2039257 A,C	28-09-1991	
			EP	0634702 A	18-01-1995	
			JP	4212002 A	03-08-1992	
			US	5333050 A	26-07-1994	
US 5332898	A	26-07-1994	NONE			
US 5321977	A	21-06-1994	EP	0608655 A	03-08-1994	
			JP	2065970 C	24-06-1996	
			JP	6281658 A	07-10-1994	
			JP	7104360 B	13-11-1995	
			US	5345816 A	13-09-1994	